Wood Science and Technology

Journal of the International Academy of Wood Science

Vol. 20 · 1986

Editors:
H. Schulz, München
W. Liese, Hamburg
T. E. Timell, Syracuse

Editorial Board:
D. G. Arganbright, Richmond
S. Chow, Vancouver
J. M. Dinwoodie, Aylesbury
W. E. Hillis, Melbourne
R. W. Kennedy, Vancouver
T. K. Kirk, Madison
D. Noack, Hamburg
K. V. Sarkanen, Seattle
Ch. Skaar, Blacksburg

Associate Editor:
K. A. Sorg, München

Springer International

Wood Science and Technology

"Wood Science and Technology" is dealing with research contributions and reviews covering the entire field of wood and pulp. Among these subjects are wood anatomy and ultrastructure, all aspects of the biology of wood such as the cytology of cambium, xylem and phloem, tree physiology and the microbiological degradation of wood, the chemistry of wood and bark, and wood physics. Problems related to wood technology include combustion, drying, and impregnation of wood, its machining, gluing, and finishing, timber mechanics and rheology, and the conversion of wood into pulp.
Manuscripts are to be submitted to the Editors, the Associate Editor, or the members of the Editorial Board.

Editors:

Prof. Dr. **H. Schulz,** Institut für Holzforschung der Universität München, Winzererstr. 45, D-8000 München 40, Germany
Prof. Dr. **W. Liese,** Institut für Holzbiologie und Holzschutz der Bundesforschungsanstalt für Forst- u. Holzwirtschaft, Leuschnerstr. 91, D-2050 Hamburg 80, Germany
Prof. **T. E. Timell,** State University College of Environmental Science and Forestry, Syracuse, New York 13210, USA

Associate Editor:

K. A. Sorg, Institut für Holzforschung der Universität München, Winzererstr. 45, D-8000 München 40, Germany

---

Copyright. Submission of a manuscript implies: that the work described has not been published before (except in the form of an abstract or as part of a published lecture, review, or thesis); that it is not under consideration for publication elsewhere; that its publication has been approved by all co-authors, if any, as well as by the responsible authorities at the institute where the work has been carried out; that, if and when the manuscript is accepted for publication, the authors agree to automatic transfer of the copyright to the publisher; and that the manuscript will not be published elsewhere in any language without the consent of the copyright holders. All articles published in this journal are protected by copyright, which covers the exclusive rights to reproduce and distribute the article (e.g., as offprints), as well as all translation rights. No material published in this journal may be reproduced photographically or stored on microfilm, in electronic data bases, video disks, etc., without first obtaining written permission from the publisher.
The use of general descriptive names, trade names, trademarks, etc., in this publication, even if not specifically identified, does not imply that these names are not protected by the relevant laws and regulations.
Special regulations for photocopies in the USA: Photocopies may be made for personal or in-house use beyond the limitations stipulated under Section 107 or 108 of U.S. Copyright Law, provided a fee is paid. This fee is US $ 0.20 per page, or a minimum of US $ 1.00 if an article contains fewer than five pages. All fees should be paid to the Copyright Clearance Center, Inc., 21 Congress Street, Salem, MA 01970, USA, stating the ISSN 0043-7719, the volume, and the first and last page numbers of each article copied. The copyright owner's consent does not include copying for general distribution, promotion, new works, or resale. In these cases, specific written permission must first be obtained from the publisher.
Other regulations: Authors publishing in this journal can, under certain conditions, benefit from library and photocopy fees collected by VG WORT. Authors of German nationality and those resident in the Federal Republic of Germany or Berlin (West), as well as citizens of Austria, Switzerland and member countries of the European Community, may apply to Verwertungsgesellschaft WORT, Abteilung Wissenschaft, Goethestraße 49, D-8000 München 2, for detailed information.

Typesetting: Konrad Triltsch, Würzburg; printing: Ruksaldruck, Berlin; bookbinding: Lüderitz & Bauer, Berlin – Printed in Germany.

© Springer-Verlag Berlin Heidelberg 1986
Springer-Verlag GmbH & Co. KG, D-1000 Berlin 33

Contents

Originals

Blechschmidt, J.; Engert, P.; Stephan, M.: The glass transition of wood from the viewpoint of mechanical pulping 263

Bulleit, W. M.; Schoch, C. G.: Simulation of load-duration effects in wood 157

Chafe, S. C.: Radial variation of collapse, volumetric shrinkage, moisture content and density in *Eucalyptus regnans* F. Muell. 253

Chafe, S. C.: Collapse, volumetric shrinkage, specific gravity and extractives in Eucalyptus and other species – Part 1: The shrinkage/specific gravity ratio 293

Dobrý, J.; Dziurzyński, A.; Rypáček, V.: Relation between combustion heat and chemical wood composition during white and brown rot 137

Gerhards, C. C.: High-temperature drying of southern pine 2 by 4's: Effect on strength and load duration in bending 349

Gierer, J.: Chemistry of delignification. Part 2: Reactions of lignins during bleaching 1

Hall, L. D.; Rajanayagam, V.: Evaluation of the distribution of water in wood by use of three dimensional proton NMR volume imaging 329

Hillis, W. E.: Forever Amber – A story of the secondary wood components 203

Hon, D. N.-S.; Feist, W. C.: Weathering characteristics of hardwood surfaces 169

Krilov, A.: Corrosion and wear of sawblade steels 361

Krilov, A.; Gref, R.: Mechanism of sawblade corrosion by polyphenolic compounds 369

Layton, T. F.; Smith, R. W.; Maeglin, R. R.: An evaluation of the saw, dry and rip process to convert red alder into studs 185

Lindgren, B. O.; Petterson, B.; Brage, C.: The reactions of lignosulfonic acid with chlorosulfamic acid 273

Mindess, S.; Bentur, A.: Crack propagation in notched wood specimens with different grain orientations 145

Mukudai, J.; Yata, S.: Modeling and simulation of viscoelastic behavior (tensile strain) of wood under moisture change 335

Nelson, Jr., R. M.: Diffusion of bound water in wood. Part 1: The driving force 125

Nelson, Jr., R. M.: Diffusion of bound water in wood. Part 2: A model for isothermal diffusion 235

Nelson, Jr., R. M.: Diffusion on bound water in wood – Part 3: A model for nonisothermal diffusion 309

Pierce, C. B.; Dinwoodie, J. M.: Creep in chipboard. Part 6: Time to failure analysis under steady conditions 281

Pizzi, A.; Conradie, W. E.; Jansen, A.: Polyflavonoid tannins – a main cause of softrot failure in CCA-treated timber 71

Pizzi, A.; Cameron, F. A.: Flavonoid tannins – structural wood components for drought-resistance mechanisms of plants 119

Rowell, R. M.; Tillman, A. M.; Liu Zhengtian: Dimensional stabilization of flakeboard by chemical modification 83

Sorvari, J.; Sjöström, E.; Klemola, A.; Laine, J. E.: Chemical characterization of wood constituents, especially lignin, in fractions separated from middle lamella and secondary wall of Norway spruce (*Picea abies*) 35

Stanish, M. A.: The roles of bound water chemical potential and gas phase diffusion in moisture transport through wood 53

Wilkins, A. P.: The nomenclature of cell wall deformations 97

Wilkins, A. P.: The distribution of cell deformations in fibres adjacent to rays in *Eucalyptus pilularis* 229

Wilson, B. F.: Apical control of compression wood action in white pine branches 111

Letters to the Editor

Maloney, T. M.: Eighteenth International Particleboard – Composite Materials Series Symposium, held at Washington State University 377

Book Reviews

Kučera, L. J.: Xylorama. Trends in wood research 110
Higuchi, T. (Ed.): Biosynthesis and biodegradation of wood components 118
Wilson, B. F. (Ed.): The growing tree. Revised Edition 228
Baas, P.; Miller, R. B. (Eds.): Functional and ecological wood anatomy 234
Findlay, W. P. K.: Preservation of timber in the tropics 234

IAWS Bulletin board

Academy news 201

Author index

Bentur, A. 145
Blechschmidt, J. 263
Brage, C. 273
Bulleit, W. M. 157
Cameron, F. A. 119
Conradie, W. E. 71
Chafe, S. C. 253, 293
Dinwoodie, J. M. 281
Dobrý, J. 137
Dziurzyński, A. 137
Engert, P. 263
Feist, W. C. 169
Gerhards, C. C. 349
Gierer, J. 1
Gref, A. 369
Hall, L. D. 329
Hillis, W. E. 203
Hon, D. N.-S. 169
Jansen, A. 71
Klemola, A. 35
Krilov, A. 361, 369
Laine, J. E. 35
Layton, T. F. 185
Lindgren, B. O. 273
Liu Zhengtian 83
Maeglin, R. R. 185
Maloney, T. M. 377
Mindness, S. 145
Mukudai, J. 335
Nelson, Jr., R. M. 125, 235, 309
Petterson, B. 273
Pierce, C. B. 281
Pizzi, A. 71, 119
Rajanayagam, V. 329
Rowell, R. M. 83
Rypáček, V. 137
Schoch, C. G. 157
Sjöström, E. 35
Smith, R. W. 185
Sorvari, J. 35
Stanish, M. A. 53
Stephan, M. 263
Tillman, A. M. 83
Wilkins, A. P. 97, 229
Wilson, B. F. 111
Yata, S. 335